

WHAT IS CLAIMED IS:

1. An air flow control device with a pressure sensing
5 assembly comprising:
 - a housing formed for mounting to an air conduit and formed for the passage of air through the housing for one of discharge into and exhaust from a room; and
 - at least one pressure tube having at least one
10 opening therein, the tube being mounted to the housing with the opening positioned proximate a known cross sectional area of the housing to communicate pressure at the opening into the tube, and the tube extending from the opening to an open distal end with the distal end
15 being secured in a position accessible from a room side of the housing, and the distal end being formed for releasable coupling of a pressure measurement device to the distal end for measurement from a room side of the housing of an air pressure differential in the housing
20 proximate the area to enable a determination of the air flow rate in the housing at the known cross sectional area.
2. The assembly as defined in claim 1 wherein,
25 the flow control device is an air diffuser having a diffuser housing, and
 - a pressure tube is secured to the diffuser housing in a position to enable measurement of supply air pressure in the housing and the distal end is positioned
30 on a room side of the diffuser housing.
3. The assembly as defined in claim 2 wherein,

the pressure tube is an elongated tube mounted to extend transversely substantially across a neck of the diffuser housing, and the elongated tube is formed with a plurality of openings spaced along the tube across the neck.

4. The assembly as defined in claim 3 wherein, the elongated tube has a closed end opposite the distal end, the openings are oriented to be approximately perpendicular to the direction of flow of the incoming supply air in the neck to enable sensing of a static air pressure differential relative to ambient room air pressure, and the tube diameter is sufficiently small so as to not significantly impede the flow rate of supply air discharged through the neck and from the diffuser.

5. The assembly as defined in claim 2 wherein, the tube is provided by a monolithically formed tube extending from a neck section of the tube to the distal end.

6. The assembly as defined in claim 2 wherein, the air diffuser is a variable air volume diffuser having a movable damper assembly, and the pressure tube is positioned to permit full opening and closing of the diffuser damper assembly.

7. The assembly as defined in claim 2 wherein, the pressure tube has a neck section which extends across the diffuser housing proximate a neck portion of the diffuser, and the pressure tube has an extension section which extends from the neck section outwardly

through an outside wall of the housing and along the outside wall of the housing to position the distal end proximate a discharge opening of the diffuser.

- 5 8. The assembly as defined in claim 7 wherein,
 the extension section passes inwardly through the
 outside wall of the diffuser proximate the discharge
 opening to position the distal end inwardly of the
 periphery of the housing at the discharge opening.
- 10 9. The assembly as defined in claim 7 wherein,
 the neck section is formed to bend around a damper
 control assembly provided in the neck portion of the
 housing.
- 15 10. The assembly as defined in claim 1, and
 an air pressure measurement device including a
 transducer assembly formed to measure the differential
 pressure between the pressure communicated to the distal
20 end of the pressure tube and an ambient room air
 pressure, and a wand coupled to the transducer at one
 end and formed at an opposite end for releasable
 coupling to the distal end of the pressure tube.
- 25 11. The assembly as defined in claim 10 wherein,
 the wand has sufficient length to enable releasable
 coupling to the distal end of the pressure tube for a
 diffuser housing mounted in the ceiling of the room.
- 30 12. The assembly as defined in claim 11 wherein,
 the pressure measurement device is a hand-held
 device, and

the opposite end of the wand includes a resiliently flexible end sleeve adapted to be slid over the distal end of the pressure tube.

- 5 13. The assembly as defined in claim 10 wherein,
the pressure measurement device is calibrated to provide an output measurement of the rate of flow of supply air discharged from the diffuser based upon the pressure difference sensed.

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14. The assembly as defined in claim 13 wherein,
the pressure measurement device is adapted to provide a plurality of outputs each calibrated to provide a rate of flow for supply air discharged from a
15 selected one of a plurality of diffusers of differing configurations.

15. A pressure sensing assembly for mounting to an air flow control system comprising:
20 a pressure tube having at least one opening therein adapted for communication of air pressure at the opening into the pressure tube, the pressure tube extending from the opening at a known cross section area of the housing to an open distal end of the tube remote of the opening
25 for the communication of pressure at the opening to the distal end; and
a mounting structure formed for mounting the pressure tube to a housing of an air flow control device with the opening positioned and orientated to
30 communicate air pressure at the opening into the pressure tube, and the mounting structure being further formed to mount the distal end of the pressure tube for access to the distal end from a room side of the air

flow control device to enable releasable coupling of a pressure measurement device to the distal end from the room side of the air flow control device.

- 5 16. The assembly as defined in claim 15 wherein,
 the air flow control device is a diffuser,
 the mounting structure is formed to mount the tube
 to extend across a neck portion of the diffuser housing,
 and
10 the pressure tube has a plurality of openings
 therein.
17. The assembly as defined in claim 15 wherein,
 the mounting structure is provided by forming the
15 pressure tube with a plurality of bends configured to
 extend through side walls of a diffuser housing.
18. The assembly as defined in claim 16 wherein,
 mounting structure is formed for orienting the
20 openings at about 90° to the direction of air flow
 across the pressure tube.
19. The assembly as defined in claim 15, and
 an air pressure measurement device including a
25 transducer formed to measure the difference between the
 air pressure in the pressure tube and ambient room air
 pressure, and a wand adapted for releasable coupling of
 the distal end of the pressure tube to the transducer.
- 30 20. A method of measuring the air pressure difference
 at a known area of an air flow control device housing
 comprising the steps of:

mounting at least one air pressure communicating tube having at least one opening therein to a housing of the air flow control device in a position in the housing having a known cross sectional area to sense supply air pressure in the air diffuser at the opening, the tube being formed to communicate the sensed air pressure to an open distal end of the tube positioned on a room side of the air flow control device;

from the room side of the air flow control device, releasably coupling an air pressure measurement device to the distal end of the tube; and

measuring an air pressure communicated to the distal end of the tube.

21. The method as defined in claim 20, and after the measuring step removing the air pressure measurement device from the distal end leaving the tube mounted in the air flow control device.

22. The method of claim 20, and the steps of: repeating the steps of claim 20 for a plurality of air flow control devices in a HVAC system; and using the measured air pressures to balance the flow rate of air discharged from the plurality of air flow control devices in the HVAC system.

23. The method as defined in claim 20 wherein, . said mounting step is accomplished by mounting the tube upstream of a damper assembly of a variable air volume diffuser; and the step of: opening the damper assembly in the diffuser to a maximum opening before the measuring step.

24. The method as defined in claim 20, and the step of:
after the measuring step, adjusting one of a
balancing damper in the HVAC system and a damper in the
diffuser to balance discharge of supply air from the
5 diffuser with the air discharged from other diffusers in
a HVAC system in which the diffuser is mounted.
25. The method as defined in claim 24 wherein,
said mounting step is accomplished by mounting the
10 tube to a fixed volume diffuser having an adjustable
damper assembly, and the step of:
adjusting the damper assembly in the diffuser to
produce a desired diffuser discharge rate.
- 15 26. The method as defined in claim 20 wherein,
said mounting step is accomplished by mounting the
tube to a variable air volume box mounted in a supply
air conduit.
- 20 27. The method as defined in claim 21 wherein,
the releasably coupling step is accomplished by
coupling a hand-held wand of a differential pressure
measurement device to the distal end of the tube.
- 25 28. The method as defined in claim 20 wherein,
the mounting step is accomplished by mounting a
single tube to the housing, and
the measuring step is accomplished by measuring a
differential pressure between the air pressure at the
30 known cross sectional area and an ambient room air
pressure.